FAA National Software Conference, May 2002
Safety & Info Security Aspects of SW Assurance

The Leveraging of Safety and Information Security Engineering Principles: Establishing an Effective Level of Integrated Risk Management

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Goal: Enhanced Safety & Security While Maintaining Performance

- Establish sound safety and information security policy as the foundation for design
- Ensure safety and information security are an integral part of overall system design
  - Reduce risk to an acceptable level depending on criticality
  - Promote a common, coordinated, and comprehensive assessment process
  - Prevent conflicting requirements
  - Develop common mitigation techniques
- Ensure product team focuses on implementing requirements
- Identify trade-offs between reducing risk, increased costs, and decreased operational effectiveness

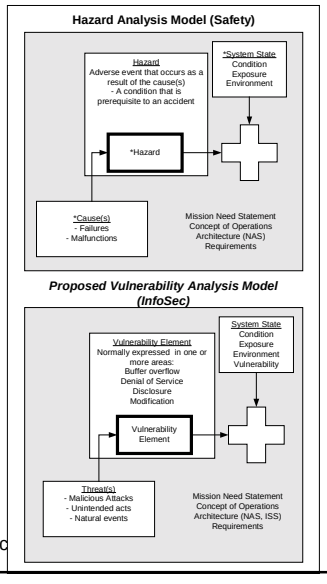
Mike Lebeau

Common Engineering Principles

- Establish a sound safety and security policy as the foundation for design
- Treat system safety and information security as an integral part of the overall system design
- All system operations represent some degree of risk
- Reduce risk to an acceptable level
- Keep hazards and vulnerabilities in the proper perspective
- Strive for simplicity
- Implement a technology refresh program
- Do not implement unnecessary risk mitigation mechanisms
- Identify and prevent common hazards and vulnerabilities

Analysis Models

- Hazard Analysis Model (Safety)
  - Causes
  - Hazards
  - System State
- Vulnerability Analysis Model (Information Security)
  - Threats
  - Vulnerabilities
  - System State



Risk Mitigation Strategy

- Hazard identification
- Hazard effect and risk level
- Requirements balance
- Requirements incorporation

Integrated Risk Index

		Severity				
		No Effect	Minor	Major	Hazardous	Catastrophic
Likelihood of Occurrence	Probable					
	Improbable					
	Extremely Remote					
	Extremely Improbable					

High

Medium

Low

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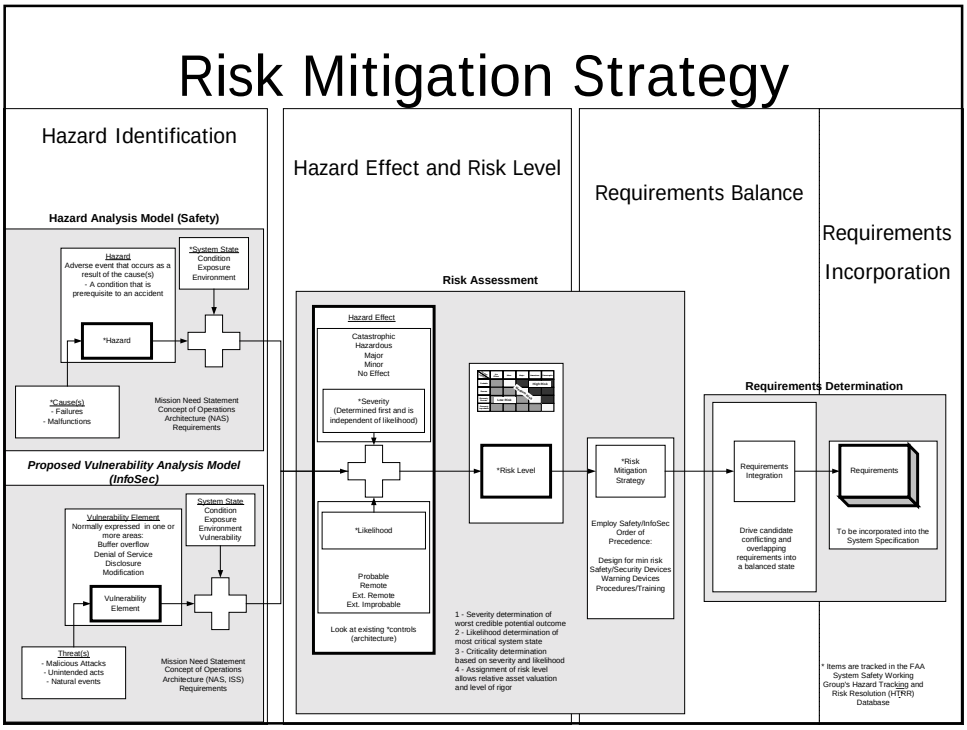
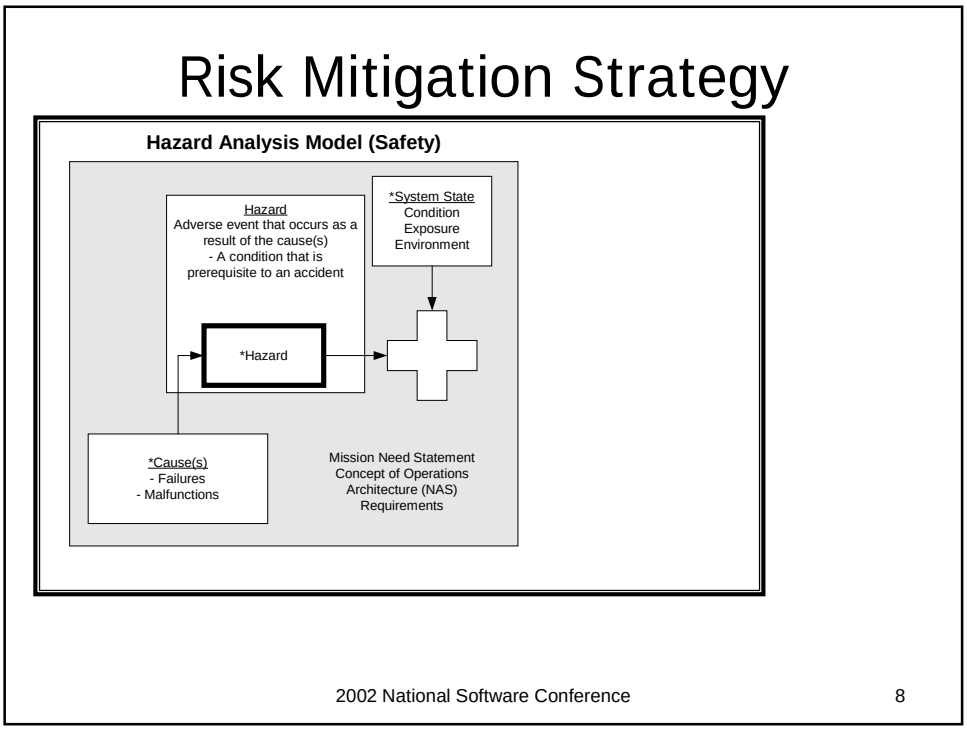
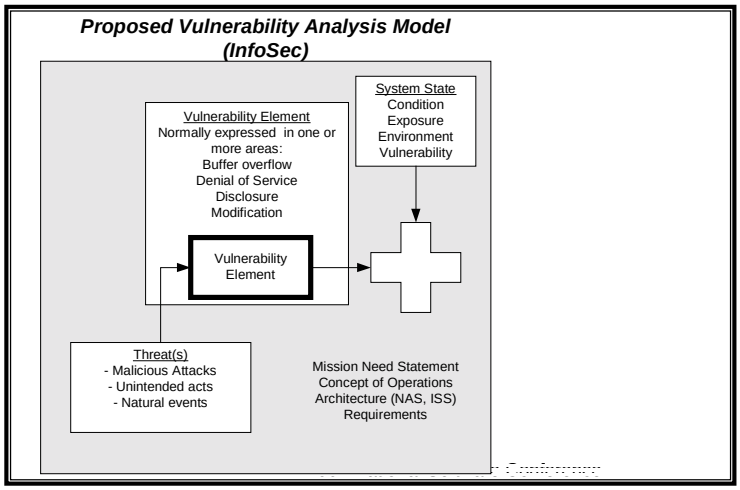




Risk Mitigation Strategy



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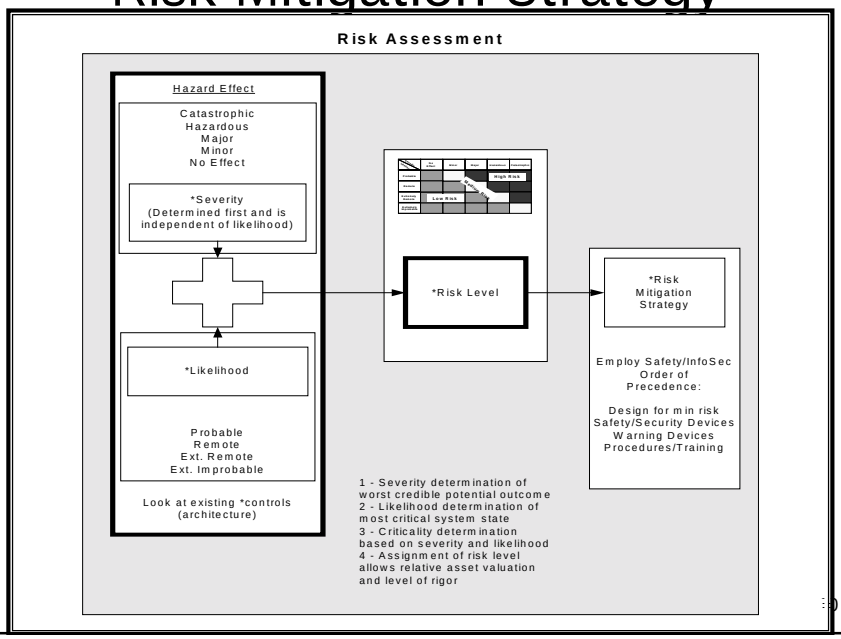
Risk Mitigation Strategy



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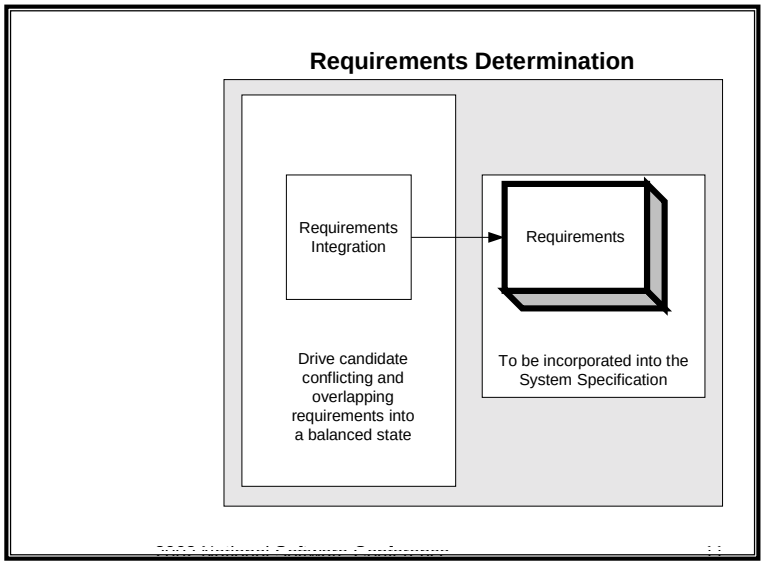
Risk Mitigation Strategy



Roles of Risk Mitigation Objectives

- Risk mitigation services: confidentiality, integrity, availability, authentication, non-repudiation
- Resolves conflicting and/or overlapping risk mitigation requirements
- Reduces system design complexity and cost
- De-confliction of requirements occurs prior to system design activities

Mechanisms	Confidentiality	Integrity	Availability
Firewalls	X		
Checksum		X	
Encryption	X	X	
Watchdog Timer		X	X

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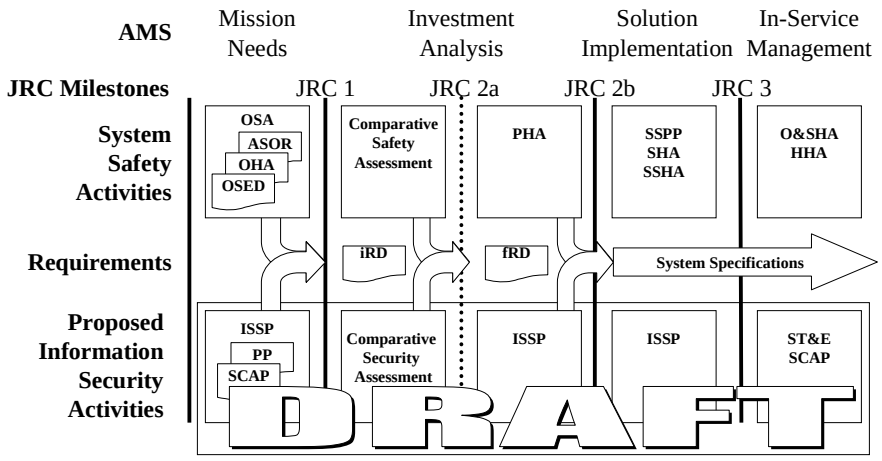
Process Alignment



Summary

- Technical:
  - Reduced complexity in system design
  - Balanced set of risk mitigation requirements
- Programmatic:
  - Better aligned with system lifecycle
  - Simplified program management
- Economic:
  - More accurate program baseline
  - Increased probability of maintaining cost and schedule targets